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## ■ Going with Coase against Coase : The Dynamic Approach to the Internalization of External Effects ■

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# GOING WITH COASE BEYOND COASE: THE DYNAMIC APPROACH TO THE INTERNALIZATION OF EXTERNAL EFFECTS<sup>1</sup>

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## Abstract

*The article develops R. H. Coase's insight that the level of transaction costs in the market determines the amount of externalities, thus providing arguments against government intervention. Contrary to Coase, however, we argue that the level of transaction costs cannot be considered as given, and that there is therefore a case for selective and innovative government intervention to reduce such transaction costs. Externalities are approached as intrinsically new and dynamic impacts, whose transaction costs diminish over time, a process that can be accelerated by appropriate government action. In contrast, internalization by means of public intervention through Pigouvian taxation is shown to be epistemologically untenable: if externalities had sufficient information content to allow governments to determine optimal tax levels, these same externalities would already have been fully internalized by the market. The final part of the article proposes two internalization strategies based on a dynamic re-interpretation of the Coasean approach. The first aims at developing feedback mechanisms between generators of externalities and those affected by them through media other than the market. The second seeks to reduce transaction costs in order to extend the domain in which markets can operate effectively by proposing codification strategies for the informational complexities characterizing externalities.*

**Keywords:** External effects, incomplete information, environmental economics, transaction costs, codification, dynamic internalization

## 1. Introduction – Taking Coase Further

Externalities are impacts on our well-being that the market system is unable to allocate in an optimal manner. It was the historical contribution of Ronald Coase to delineate this limitation of the market system with the help of the notion of transaction costs (Coase (1937)). The market stops where transaction costs are too high. Beyond that point we enter the realm of externalities.

This fundamental insight has usually been interpreted as implying a “hands-off” approach for practical policymaking with respect to externalities. The argument is usually referred to as the “Coase theorem”, which centers on the proposition that in a world without transaction costs private and social costs are identical and production is maximized. It is well known that Coase's original work never stated any such theorem and that even his later comments on the issue consist of loose criticisms concerning the earlier formulation by George Stigler, who must be credited with the original formulation of the “Coase theorem” (Stigler (1966), p. 113). Despite the complicated paternity and subsequent permutations of the Coase theorem (see Bertrand (2006) on this issue),

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<sup>1</sup> I would like to thank the participants in the seminar on “Theory and Measurement of Externalities” at the University Paris-Dauphine on 31 October 2007 organized by the *Finance et développement durable: approches quantitatives* Chair. Valuable comments were received by Françoise Forges and Damien Fessler.

the essential message of both Stigler and Coase on the issue of externalities is clear. First, in the absence of transaction costs, all externalities are internalized and thus disappear as externalities. Second, if transaction costs exist, their size determines the amount of existing externalities. Despite providing different answers to the question “Should economic science include considerations concerning non-codifiable transaction costs?”, which have different implications for the epistemological status of economic theory, the two statements are equivalent with respect to policymaking.

Both Stigler and Coase see the market system as the natural limit to any solution to the problem. Externalities will disappear to the extent that the reach of the market can be extended. While Coase emphasizes the fact that transaction costs form a sort of natural barrier to this extension of the market system that will require us to learn to live with an irreducible residual of externalities, neither considers government capable of improving on the situation, in explicit opposition to the Pigouvian approach (see below). This article argues that the original Coasean approach, whether expressed by Stigler or Coase, does of course formulate valid insights but has so far been inadequately interpreted in terms of its policy implications. This is due to two interrelated reasons. First, despite his unparalleled flair and intuitive understanding of the impact of transaction costs on economic exchange, Coase unfortunately never engaged in a more comprehensive characterization of transaction costs. Far from being an incompressible residual, they constitute a dynamic, highly malleable and intrinsically public phenomenon, which has important implications for the role that public policies can play in reducing them. Second, both Stigler and Coase adopt a static framework for the analysis of the intrinsically dynamic phenomena constituted by externalities.

Treating transaction costs as phenomena linked to the transient status of the information possessed and required by market participants permits a new approach to externalities. Transaction costs not only imply the existence of externalities, but the two notions are consubstantial. Both refer to the extra-economic reality of human interactions in constant flux that is not captured in the prices for well-defined goods. Externalities do not exist as natural phenomena which can unequivocally be identified as epistemological objects for formal analysis. Rather they are permanently internalized and created by the market system itself in its incessant effort to separate goods for which prices can be found from those for which they cannot. Partitioning out a clearly defined and codified economic “good” from the complexity of the human world implies creating externalities by simply abstracting from the numerous contiguous links which connect this “good” to the totality of the natural and social environment from which it emanates.<sup>2</sup>

This separation of the economic from the non-economic does not constitute, in itself, a problem for economic theory. On the contrary, it is a necessary condition for establishing the epistemological objects with which economic science deals and is thus a vital condition for its own legitimacy as an independent scientific discipline. The conundrum for economic theory arises only with the fact that the remainder left over after the pricing process has done its work – the unconsidered links between the economic and the extra-economic world – have welfare relevance. Externalities and the market system implicate each other in a complementary relationship whose precise limits are constantly being renegotiated. This has profound implications for the public policies addressing externalities.

Transaction costs and externalities (for reasons of convention, we will continue to refer to the two notions side by side) are two sides of the same coin of an as yet un-codified welfare impact. Codifying a significant new welfare impact means reducing transaction costs, making it marketable and progressing with internalization. Codification in this context involves the establishment and measurement of universally accepted cause-impact relations and the formation of stable

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<sup>2</sup> It is obvious that in this approach a zero-level of un-internalised externalities is not only undesirable but also intrinsically impossible. It would in fact mean putting a brake on the evolution of the market system.

preferences. This is why externalities and transaction costs need to be approached within a dynamic perspective. Markets not only work best with codified goods, they also are also permanently engaged in a process of formatting goods – both in their objective physical manifestation and in their subjective perception.

This article will thus use a thoroughly Coasean approach to externalities, in the sense that it considers externalities to exist to the extent that transaction costs prevail. However, taking this approach further, it will constitute an argument for coherent and effective public intervention to internalize externalities. Naturally, the task of policy in this case is no longer to substitute itself for market outcomes but to enable the market system to reduce transaction costs and to proceed towards successful internalization, where this is most needed. It means taking both Stigler and Coase by the letter and profoundly respecting the logic of their respective arguments so as to arrive at policy implications that for methodological as well as ideological reasons were beyond their grasp.

## 2. The Pigouvian Trap

The purpose of this chapter is not primarily historical, but is rather to familiarize the reader with the line of reasoning we make reference to in our argument and which can be traced to a first, emblematic contribution to the theory of external effects. The first economist to explicitly state that markets do not fully capture all welfare relevant aspects of a marketable good was Arthur Cecil Pigou in *Wealth and Welfare* (1912), an approach later elaborated on in the better known *Economics of Welfare* (1920). His now canonical distinction between the “private” costs of a train-ride and the “social” costs caused by the sparks flying from the train’s chimney and setting crops on fire firmly grounded the notion of externalities in the public realm. The distinction is not obvious at first sight and absolutely essential at second sight. After all, the farmers whom Pigou deemed affected by the external effects of the passing trains paid for these effects in a very tangible, private manner through the loss of their crops by fires due to flying sparks.

However, once we delve into the nature of the transaction costs that prevent straightforward internalization through the tort liability system, their public nature becomes immediately clear. First, the legal situation may not be straightforward. This was, of course, one of Coase’s key messages in “The Problem of Social Cost”, thus separating the specific cost of establishing binding property rights (and concomitant liabilities) from other more generic transaction costs. Second, the causal relationships and the socially relevant valuations may not be established. Which part of the crop loss is actually due to flying sparks? Can this be proven? What is the residual value of the remaining crop? And so on.

In the absence of established protocols for settling the issue, the individual farmer may well decide not to ask for compensation, given the low odds that the small-town lawyer he may be able to mobilize will prevail against the specialized legal experts of the railway company. It is obvious that without prior public measures the transaction costs in this example are very high. It also obvious that the transaction costs are a “social” problem and can only be addressed by collective action: establishing rights and liabilities, measuring damage, conventions for establishing torts. Further research on this issue, however, showed that this is precisely what happened, thus invalidating Pigou’s example. Coase himself, in “The Problem of Social Cost”, quotes from *Halsbury’s Laws of England*:

“If railway undertakers use steam engines on their railways [...] they are liable, irrespective of any negligence on their part for fires caused by sparks from engines (Coase (1960 (1988)), p. 136).”<sup>3</sup>

While this shows that Pigou had chosen an inappropriate example – and for a reason, as will become clear in the following discussion – it also indicates, with respect to the unsatisfactory nature of the discussion about externalities, that Coase’s research was undertaken from a polemical perspective of showing that no policy-relevant externalities exist.<sup>4</sup> This is, of course, wrong. Policy-relevant externalities arise and disappear at all times.

However, let us first deal with the trap in which Pigou ensnared himself. The mistaken choice of example could only arise because of Pigou’s insistence on two crucial characteristics of externalities. First, external effects and their internalization can take place in a system of static optimization. Second, in order to do so, governments possess all the knowledge about liabilities, causal relationships and damage costs that private participants lack, from which the imposition of a shadow price in the form of a “Pigouvian tax” logically follows. Pigou thus correctly identified externalities as social issue, but then fell into the trap of subsequently treating externalities as fully codified goods, for which it only so happened that governments rather than markets would need to take responsibility.<sup>5</sup>

Coase was, of course, correct to launch an attack on this paradoxical position in 1960 by pointing out that private parties were fully capable of optimally treating externalities if they possessed the same information and low transaction costs Pigou assumed governments to have. He was also well placed to do so given that in “The Nature of the Firm” (1937) he had already defined the limits of the market system in terms of transaction costs. In perfect symmetry, “The Problem of Social Cost” makes exactly the same argument from the other side. The market can be extended up to the point that transaction costs are sufficiently low.

The point was taken up by Kenneth Arrow in “The Organization of Economic Activity: Issues Pertinent to the Choice of Market versus Non-Market Allocation” (1970) with customary elegance. In identifying the non-existence of markets as the underlying reason for the existence of externalities, he wrote:

“The problem of externalities is [...] a special case of a more general phenomenon: the failure of markets to exist [...]. The discussions in the preceding sections [on the non-existence of markets] suggest two sources of transaction costs: (1) exclusion costs and (2) costs of communication and information, including both the supplying and the learning of the terms on which transactions can be carried out (Arrow (1970), 76f).”

Externalities are thus goods for which no markets exist due to the paucity of available information. Indeed Arrow had a deep understanding of informational complexity and the up-front work

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<sup>3</sup> To be precise, that liability only applies to railways without “express statutory authority”. But this only affects the distribution of property rights and does not in the least affect the basic point: the externality Pigou used as a paradigm case for government intervention by means of a corrective tax was already at the time well known, researched and fully internalized by the legal system.

<sup>4</sup> In fact, it was subsequently shown by Coase and others that many classic examples of externalities (such as lighthouses or the pollination of fruit trees) were, in fact, negotiated on markets like any other private good. To some extent even the comprehensive judicial tort system in Anglo-Saxon jurisdictions can be interpreted as a series of organized bilateral markets for otherwise uninternalized externalities.

<sup>5</sup> Elsewhere, we have commented more widely on the paradox of the Pigouvian position. See Keppler (1998), “Fixed Costs, Information and Externalities”.

necessary to transform it into codified nuggets of information – an essential pre-requisite for the creation of marketable goods. The following paragraph highlights the extent to which he considered such codification to be essential for the reduction of transaction costs and market exchange:

“To cooperate and to take advantage of the division of labor, there must be an exchange of information in one way or another. Let us draw upon [...] information theory [...] [which considers that] communication is a costly operation [...]. Roughly speaking, you want to phrase the messages that occur most frequently in as short a way as possible [...]. Concepts used repeatedly are given short technical names, so that a couple of words convey a whole thought [...]. This is an illustration of the process that is sometimes called ‘encoding’ (Arrow (1979), 161).”

However, Arrow also had a reputation as a theoretical economist to defend and never provided more than these tantalizing fragments on the issue of externalities. Subsequently, the Pigouvian approach to externalities prevailed despite the inherent contradiction of treating externalities as already fully codified goods. The tone was set by *The Theory of Environmental Policy* by Baumol and Oates in 1988, which was built on an analytical formulation of the Pigouvian approach. Works by Pearce, Freeman, Sandmo, Kneese, Costanza and many others followed and further explored different aspects of the Pigouvian approach to static optimization, characterized by the paradoxical double assumption of full information *and* the need for government intervention.

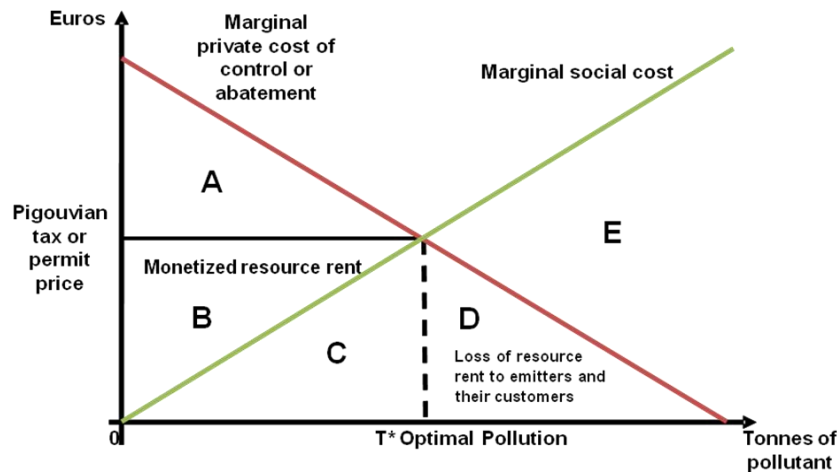
Equalizing marginal social cost and the marginal private cost of abatement (or marginal private benefit) to determine the optimal amount of externalities became *de rigueur* the static framework of environmental economics. The cross formed by continuous marginal cost and benefit curves became the iconic representation of that approach (see below). Consequently taxes became the policy instrument of choice for the internalization of externalities, in particular environmental externalities. Environmental taxes have, of course, a number of highly beneficial effects. They have low institutional transaction costs, provide clear incentives for market participants and do not preempt technological choices, while at the same time “inducing” technological change in the right direction. Furthermore, they can be used to offset distortive taxes on labor, capital or transactions.<sup>6</sup> However, their ability satisfactorily to solve the theoretical problem of the optimal internalization of externalities is limited.

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It is impossible here to provide even an outline of the richness of the literature elaborating on the Pigouvian approach, which includes work on the relative efficiency of price- and quantity-based mechanisms (for instance Weitzman, 1974), the distributional impact of regulatory instruments, taxes or tax equivalent systems such as emissions trading (Cruciani and Keppler, 2009) and tax interaction effects (Goulder, 1999).

Figure 1  
*Optimal internalization in a Pigouvian framework*



Thus a massive literature was built on the underlying assumption that externalities were well-defined goods that just happened to have been overlooked for the market system. In other words, social costs were considered well-defined, measurable, monetizable, continuous and differentiable. The fact that the market system would have been eager and perfectly able to internalize real-world externalities if they had displayed such desirable informational qualities was literally never even mentioned. On epistemological grounds, the contradiction was blatant: externalities could be dealt with applying all the rigor and sophistication of standard economic theory as long as they were treated akin to other economic goods, in other words, as long as they were no longer treated as externalities.

It is easy to understand why such a paradoxical situation could persist for so long. In the minds of environmental economists, the cost of epistemological incoherence was more than offset by the benefits of increased methodological attractiveness. The analytic formulation of the Pigouvian approach allowed the environmental economic profession to enter the methodological mainstream. Differential calculus, game theory, even general equilibrium theory (in the work of Karl-Goran Maler) all found “environmental” applications. Environmental economics became respectable, and enjoyed all the power and prestige in terms of academic journals and positions that comes with respectability.<sup>7</sup>

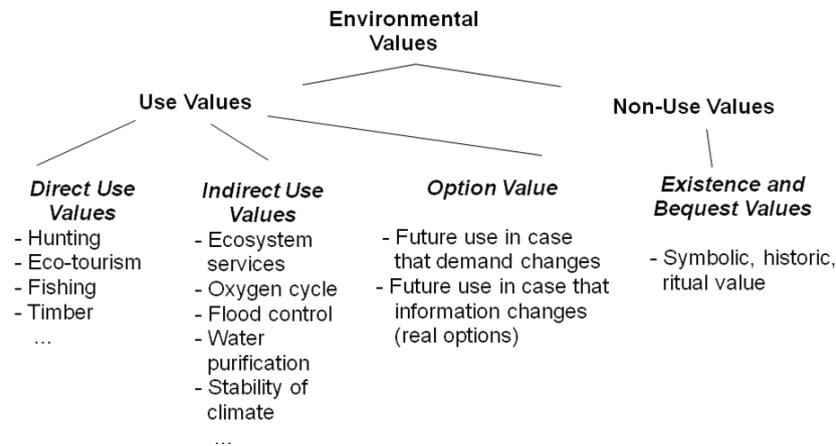
### 3. Addressing the information issue... and leaving it unresolved

Most environmental economists would probably bristle at the criticism that modern environmental economics disregards the information problem. After all, the Achilles’ heel of the Pigouvian approach was rather obvious. The Pigouvian approach to externalities hinges on overcoming the information barrier concerning the value of social costs, and much theoretical and practical effort went into its measurement. Thus many attempts were made to break down the complex notion of

<sup>7</sup> Let us be clear that the criticisms addressed to environmental economics go far beyond the standard criticism of economic theory, namely that it is too far removed from reality. While an assumption such as perfect information in general economics constitutes a necessary abstraction that to some extent generates the added value of the model even if that removes it from immediately observable reality, the same assumption in environmental economics defeats its very *raison d’être*, i.e. the claim of being able to include a class of welfare-relevant arguments characterized by less-than-complete information within economic discourse, arguments that are traditionally excluded from standard economic theorizing.

“environmental social costs” into its component parts in the hope that they would thus become more tractable.

*Figure 2*  
**The components of environmental value**



However, such breakdowns only underline the essential problem. If direct use values such as hunting or tourism could be neatly separated from existence and bequest values, then the former could be dealt with by the market mechanism. The latter would, more than ever, require public intervention in the face of “market failure”, given their inability to yield well-defined social cost schedules. One could, of course, devise sensible internalization strategies by extending the market mechanism wherever possible, in an ongoing attempt to reduce the extent of the intractable core of externalities.

However, admitting the existence of a core of external effects impervious to the standard Pigouvian approach would endanger the methodological respectability of environmental economics as a whole. Economic theory after all relies on the systematic and complete codification of its arguments. Environmental economists have thus devised a number of strategies aiming at the full codification of external effects. In other words, such strategies seek to evaluate social costs in monetary terms, oblivious to the fact that if these estimates had any credibility (not least with the public authorities presumed to be financing them) private providers would step forward to provide or protect them. Without any claim to completeness, one may mention:

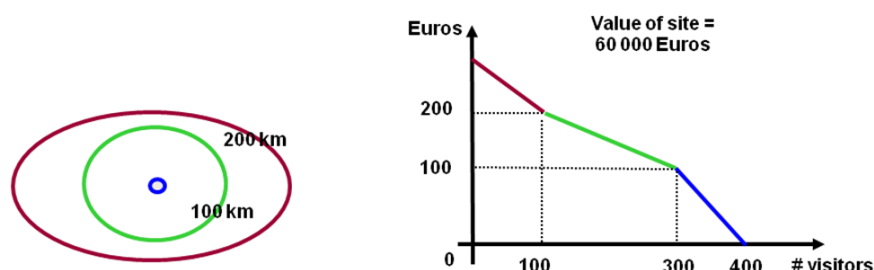
1. The **direct evaluation of damage** through replacement or remediation costs (for instance, damage to houses and other structures due to air pollution).
2. The **measurement of ecosystem services** provided by natural habitats (pollination services, prevention of erosion, water purification, the provision of genetic resources etc.). Again, the usual measure is to take replacement costs as a lower bound of true value.
3. The **travel cost method** for measuring the value of tourist sites, based on estimating the demand functions of visitors traveling different distances (see Figure 3 below).



Figure 3

**An illustration of the travel cost method**

(The number of visitors from different population basins and their respective travel costs can provide a lower bound for their utility from visiting the site in question)



4. **Hedonic pricing**, which relies on deriving the value of a public good, say a park, from the impact it has on related private goods, such as houses that are at different walking distances from the park. It relies on estimating econometrically the equation:

$$\text{House price} = \alpha + \beta_1 \cdot \text{size} + \beta_2 \cdot \text{year} + \beta_3 \cdot \text{closeness to park}.$$

Once the price elasticity  $\beta_3$  is estimated and the available housing has been assessed, the absolute price impact of the park can be derived and taken as its “value”.

It is obvious that these four methods are useful for measuring the value of public goods only to the extent that they concern the impact on private goods. In other words, they only measure the first two columns in the graph depicting the components of environmental value. Consider the example given for the hedonic pricing method: a private entrepreneur might provide the amenity of a private park to increase the value of a new housing development precisely up to the point that is determined by the hedonic pricing method in connection with a public park. The public park, however, has a much higher value, in that it is visited by school children, the elderly, tourists, ambulators etc. who will never even consider buying a property in the area.

In other words, none of the four methods listed above is capable of capturing true public goods. This is why environmental economists have developed a further method, which crystallizes the futility of the paradoxical and ultimate self-defeating attempt to quantify the class of welfare impacts that by their very definition are uncodifiable. This measure is usually referred to as contingent valuation, and due to its practical importance and epistemological exemplarity, we shall comment on it more extensively in the next section.

#### 4. Contingent valuation

On the face of it, **contingent valuation** neatly cuts the Gordian knot created by the ambiguities and inadequacies of the proceeding approaches with one swift stroke of the methodological sword: if one wants to know the true value of a public good, its complete value including existence, bequest and option values in addition to direct and indirect use values, one just needs to ask those benefiting from it. Using a simple questionnaire, contingent valuation superficially avoids the methodological pitfall of the four preceding approaches –applying sound private reasoning to public goods – only to stumble headlong into it on a slightly deeper level. Asking people to answer the question “How much would you be willing to pay for the public good in question?” provides a contingent valuation

that captures, in principle, *all* the utility-relevant aspect of a public good.<sup>8</sup> As far as the provision or protection of a public good is concerned, no aspect is excluded. However, as far as the consumer or recipient of the public good is concerned, the confusion between a private and a public good is even more entrenched.

Asking someone to compare the value of the “environment” he experiences every day in a vague and multi-dimensional way to the marketable he goods he buys or sells, assumes that the processes of preference formation for the two categories of goods are comparable. But the same informational problem that was identified in regard to the notion of “transaction costs” on the supply side now arises on the demand side. Economic (market) value is, ever since Adam Smith, an inter-subjective notion.<sup>9</sup> Asking someone for a conclusive answer in regard to an inter-subjective process of value formation established through a process of haggling, buying and selling that has not even begun, is a sign more of considerable epistemological than methodological naivety. What is in question is not so much the method itself, but its underlying hypotheses concerning the existence of a well-defined informational structure of preferences for public goods and their impact on utility. Contingent evaluation is only possible on the basis of a blatant confusion of use value and exchange value. The existence of the former in a generalized, non-codified and vague form that is specific to each individual, in no way implies the existence of the latter.

In the light of this fundamental weakness of contingent valuation, it hardly seems to matter that this particular attempt at establishing monetary values for public goods also raises some tricky theoretical questions as to the framing of the question itself and to the distinction between:

- a) willingness-to-pay and willingness-to-accept,
- b) compensating and equivalent variation, and
- c) Hicksian and Marshallian demand.

At first sight, it would seem that the questions “How much would you pay to progress from level A to a higher level B of environmental quality?” and “How high would the compensation need to be for you to accept a decrease from the higher quality level B to level A?” should yield comparable answers. The two answers are, however, quite different. The reason for this is that the first question is put *ceteris paribus* to an individual possessing a lower level of income than the second individual. The first individual’s answer would have been to the same as the second individual’s only if the question had been “How much would we need to compensate you for the fact that the promised improvement from A to B never took place?” The second individual’s answer would have been equal if the question had been “How much would you be willing to pay to avoid the decrease from B to A?”

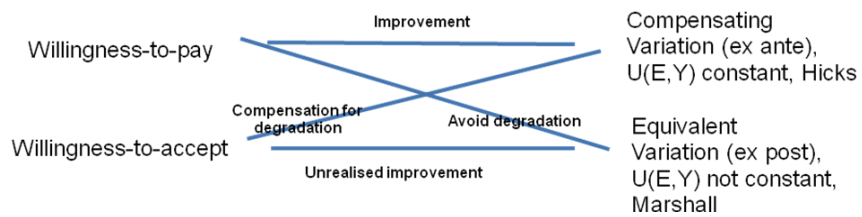
The reason is that in the first two examples, the *ex ante* utility levels of the change in environmental quality are the relevant parameters for assessing the equivalence of environmental quality change and its monetary equivalent (compensating variation), while in the second two examples, the *ex post* utility levels of change are the relevant parameters (equivalent variation). The first pair of questions thus assumes Hicksian demand functions with constant utility levels, while the second pair assumes Marshallian demand functions that incorporate the changes into the future utility levels.

#### Figure 4

<sup>8</sup> Our criticism abstracts here from the question of strategic behavior (for instance by indicating higher values than the “true” values) that can, in principle, be solved by more intelligent questionnaires, control questions, framing, etc.

<sup>9</sup> See, for instance, Keppler (2008).

### *The relationships between different welfare measures I*

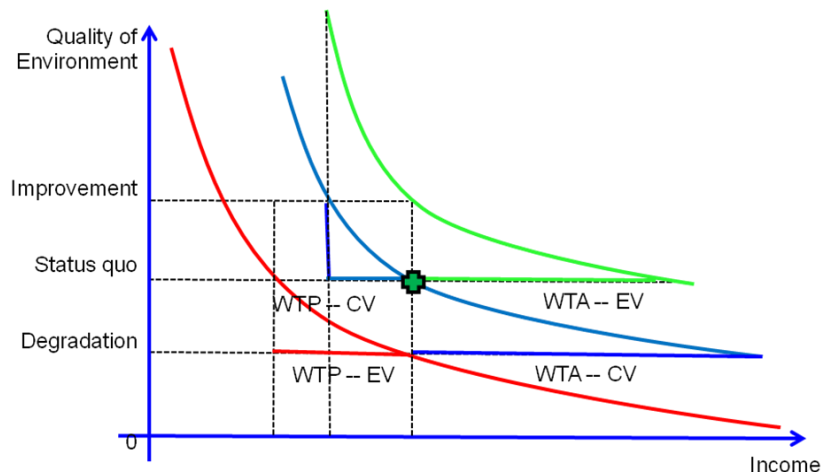


Source: Keppler (1991).

The two graphs further elucidate the relations between these different measures of the value of the public good of environmental quality. It is left to the reader to decide which measure provides the “true” value of the environment.

Figure 5

### *The relationships between different welfare measures II*



Source: Keppler (1991).

Finally, however, such specific theoretical questions do not pose the decisive difficulty of finding monetary expressions of the value of public goods and of the externalities that threaten to destroy or to diminish them. The key point remains that there is no escaping the Coasean verdict that what is hidden behind the veil of transaction costs cannot easily be drawn out into the light of overt monetization. Or in Coase's own words:

“My point was simply that such tax proposals are the stuff that dreams are made of. In my youth it was said that what was too silly to be said may be sung. In modern economics it may be put into mathematics (Coase (1988), 185).”

## **5. The seductive self-sufficiency of the static Coasean approach**

So if externalities cannot be convincingly measured and monetized in the spirit of the Pigouvian approach, and if therefore their smooth integration into a market system remains elusive, is the right policy approach then to leave good enough alone and refrain from any policy action to internalize externalities? In other words, do policy-relevant external effects perhaps really not exist? This has, of course, been the point of view of a libertarian tradition following George Stigler's formulation of the “Coase theorem”, which states that in the absence of transaction costs private

bargaining over the externality in question will lead to an efficient outcome regardless of the initial allocation of property rights. George Stigler had formulated the *Coase Theorem* as follows:

“[...] when there are no transaction costs the assignments of legal rights have no effect upon the allocation of resources among economic enterprises (Stigler (1988), 77).”

and

“[...] the magnitude of the transaction costs puts a ceiling on how large external economies [...] can be (*ibid.*, 78).”

In essence, this formulation only states that frictionless markets are efficient and applies this assertion to the class of utility-relevant goods hitherto referred to as external effects. The attentive reader will appreciate that Stigler’s formulation repeats precisely the same epistemological paradox that we identified earlier in Pigou’s approach. As long as there are no transaction costs, externalities can be treated just like other goods, with the result in Coase’s words that “with zero transaction costs, private and social costs will be equal... [and] the value of production would be maximized Coase (1988), 159).” These statements, while formally correct, are devoid of content, since they deal with a class of goods whose very existence depends on transaction costs.

Ronald Coase insisted in other instances on the existence of positive transaction costs and his desire to examine their impact:

“In sections III and IV [of the “The Problem of Social Cost”], I examined what would happen in a world in which transaction costs were assumed to be zero. My aim in doing so was not to describe what life would be like in such a world but [...] to make clear the fundamental role which transaction costs do, and should, play in the fashioning of the institutions which make up the economic system (*ibid.*, p. 13).

And more forcefully still:

“The world of zero transaction costs has often been described as a Coasean world. Nothing could be further from the truth. It is the world of modern economic theory, on which I was hoping to persuade economists to leave (*ibid.*, 174).”

Coase also provided a definition of transaction costs which is now standard but was less so at the time:

“In order to carry out a market transaction, it is necessary to discover who it is that one wishes to deal with, inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on. These operations are often extremely costly, sufficiently costly at any rate to prevent many transactions that would be carried out in a world in which the pricing system worked without cost (*ibid.*, 114).”

What Coase, however, failed to identify were the reasons that distinguish transaction costs from other costs, i.e. he does not answer the question of why there is no market for transactions as there is for other factors of production.<sup>10</sup> The reason is, of course, the absence of codification. Transaction

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<sup>10</sup> There are, of course, markets for transactions, as any broker will tell you. But what Coase refers to are those transaction costs to which the division of labor cannot be applied.

costs concern the messy, ill-defined, all-pervasive slush of human life from which well-defined economic goods need to be extracted before they can be brought to market.<sup>11</sup>

If transaction costs exist, so too will externalities. To the extent that externalities have impacts that outweigh the transaction costs, private bargaining will internalize them up to the cost of the transactions. Implicit in the argument is that given the imperfect informational structure of externalities, governments do not have any intrinsic advantage over the private sector in addressing them. In other words, there is – in the static perspective that both Coase and Stigler had in mind – nothing to be done about them. Ronald Coase and George Stigler, each in his own way, are both perfectly consistent with the axiom of Professor Pangloss, the mentor of young Candide in Voltaire's eponymous novel, that "this is the best of all possible worlds". If at any time external effects existed whose internalization would cost less than the transaction costs that created them in the first place, surely people would internalize them through private bargaining. In an efficient world, they already have.

The argument is general, simple and seductive. Its policy implications are clear and easily implementable: hands off. The argument is also correct as long as the externality issue is treated with the help of a static general equilibrium view, in which *ceteris paribus* holds, i.e. the level of transaction costs does not change during the period of analysis. So why do most people react with intuitive disbelief to the proposition that external effects such as environmental pollution are best left alone?<sup>12</sup> The reason is that the application of static equilibrium thinking – which is a defensible methodology in all other areas of microeconomic theory – is profoundly unsuited for discussing externalities.

Externalities are characterized by their diffuse, informationally unstructured, open and un-codified nature. This absence of informational linearity constitutes precisely the transaction costs between two parties who would otherwise both benefit from a movement towards a Pareto superior constellation through a better allocation of externalities. It does not matter whether this happens by forcing the originator to pay for the damage caused or by allowing the agent impacted to offer compensatory payments to the perpetrator to reduce the damage he causes.

However, even if one acknowledges that the uncoded nature of externalities creates transaction costs that prevent internalization, its diffuse, informationally unstructured and uncoded nature does not allow a stable equilibrium to occur either. Human nature, being what it is, seeks to describe, analyze, categorize, define and codify welfare-relevant arguments. Semantic entities coalesce over time to ever more determined notions through which interpersonal communication can take place with a reasonable amount of certainty. Once communication at low cost is possible, haggling, bargaining and optimization will not be far away.

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<sup>11</sup> Nevertheless, Coase's insistence on the existence and importance of transaction costs is considerable progress from the empty tautology of the "Coase Theorem". In fairness to George Stigler, however, one should state that his formulation of the "theorem", which put Coase's work on the map, was primarily concerned with policy implications rather than with more subtle methodological or epistemological points. Stigler was always the great propagandist of the Chicago School and its *laissez faire* beliefs. For that purpose, an empirically empty but immediately striking formulation served better than one that was more complete and nuanced. Furthermore, the policy conclusions that Coase draws from his own work do not differ from Stigler's.

<sup>12</sup> Provoking such intuitive disbelief and maintaining their arguments was, of course, on the face of it, an exquisite pleasure for Chicago economists such as Stigler and Coase. In fact, a significant part of the Chicago aura came from the implicit or explicit assertion that even relatively simple economic thinking, as long as it was undertaken by qualified professionals steeped in such thinking, could arrive at new and far-reaching policy conclusions profoundly at odds with people's conditioned reflexes.

In other words, transaction costs are not fixed. Intrinsically, the slow but persistent work of codification will reduce them and integrate ever greater swathes of external effects into the market system. Every single externality problem of recent decades has followed this path. Identified by fringe groups, amplified by a progressive minority, pored over by scientists and experts, taken to heart by interest groups, broken down into policy positions and legislative proposals by the political process and finally integrated by market participants – such is the lifecycle of an externality. Of course, some issues fall by the wayside (global cooling), while others take far too long to be addressed (asbestos), but the tendency is inexorably towards less uncertainty and greater codification.<sup>13</sup>

Externalities and transaction costs are intrinsically dynamic phenomena. Technological advances, institutional progress and preference change all have a bearing on the level of transaction costs in the market. External effects need to be thought of as essentially *new* phenomena. Once this simple observation is accepted, it allows for a vast array of innovative effective policy responses that avoid both the conceptual absurdity of the Pigouvian approach and the callous indifference of the Chicago approach.

## **6. A Neo-Coasean Framework for Dynamically Internalizing Externalities**

In the following, we pursue a strictly Coasean approach to the extent that we base our argument on the proposition that the amount of externalities corresponds to the level of transaction costs in the market. However, contrary to Ronald Coase, we argue in addition that transaction costs are not exogenously given but are contingent on the actions of participants. In other words, transaction costs are *endogenous* to the process of internalizing externalities. Once this fundamental point is accepted, internalizing externalities simply means reducing transaction costs by whatever means available. The key difference between the classic Coasean and the neo-Coasean framework proposed here is the claim that technological, organizational and informational improvements permanently expand the set of *internalizable* externalities.<sup>14</sup>

In order to fully understand this approach it is helpful to go back to the definition of an externality as a “good with a welfare impact not taken into account by the agent producing it.” This simple definition specifies the fundamental difference between goods that are externalities and those that are not – the existence of a feedback mechanism between those affected by it, positively or negatively, and those producing it. Normal marketable goods, of course, have a simple and complete feedback mechanism through the market price. You provide a valuable good to me, I pay. You take something from me, you pay. In competitive markets, this reciprocity guarantees efficiency and optimality.

Such feedback mechanisms precisely do not exist in the case of externalities. You pollute and take my fresh air, and nothing happens. I appropriate the insights of your research, and again nothing happens. The graph below demonstrates this missing link in the simplest possible manner for a

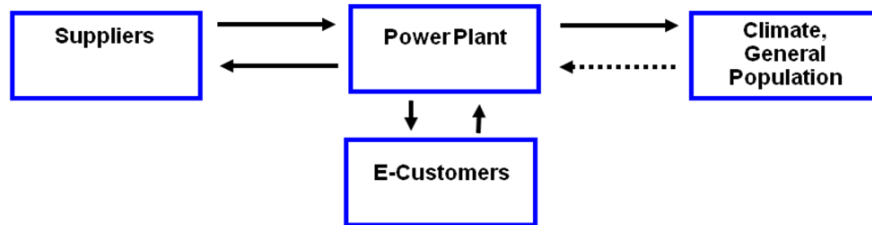
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<sup>13</sup> The fact that this process is inexorable should not be seen as justifying the “hands off” approach of the Chicago School. The key point is that this process can be sustained and accelerated through public action in the interest of welfare improvement and economic progress. In fact, it would be possible to develop a theory of public institutions based on reducing transaction costs, codifying complex issues, allocating property rights and responsibilities, assisting in preference formation and thus internalising externalities.

<sup>14</sup> The counter-argument that the essence of economic theory is to work with static equilibria is a *non sequitur* since it would be equivalent to saying that economic theory should not concern itself with externalities. There are economists who take this position, and while they might not win prizes for openness of mind or for policy relevance, they are at least methodologically consistent. Externalities, which are dynamic phenomena in permanent flux, are in themselves indicators that the economic system is *not* in equilibrium.

power plant that negotiates its inputs (say coal) and part of its outputs (electricity) on markets with feedback mechanisms that exist, and shows the absence of such a link for the other part of its outputs, namely pollution and greenhouse gas emissions.

*Figure 6*  
***The missing feedback mechanism***



So far, so good. The fact that the existence of externalities is equivalent to the absence of markets had been known at least since Arrow (1970). However, the debate was left there. The attitude was: if the market cannot price it, leave it un-priced (Chicago) or let the government determine the price or, alternatively, the quantity (Pigou). But missing from the debate were the two following policy-relevant insights:

1. Feedback for the internalization of externalities can be provided through mechanisms other than market.
2. The reduction of transaction costs can extend the reach and pertinence of the market mechanism for the internalization of externalities.

Both insights are based on the premise that externalities are currently outside of market-based decision-making due to transaction costs of an informational nature. They also both provide helpful perspectives for establishing relevant feedback mechanisms in order to proceed towards internalization. However, while they are closely linked and complementary they are not identical.

The first insight accepts the complex informational nature of externalities and thus that their internalization through the market mechanism is currently not an option. This does not mean that internalization as such has to remain beyond the scope of policymaking. Political and legal processes, institution-building, and deliberative processes in civil society are examples of areas where the establishment of feedback mechanisms between the parties concerned takes place. Clearly, there exists an enormous spectrum of mechanisms for internalization. Even the Chicago School with Ronald Coase and George Stigler was well aware of this fact, albeit in a rather restricted fashion: establishing and allocating property rights, perhaps the most fundamental of economic institutions, was to be the first and necessary step in any process of internalizing externalities.

The array of possibilities for the internalization of externalities through institutional and deliberative processes in the widest sense is, of course, infinitely larger. To some extent, the creation of institutions themselves is intrinsically linked to their function of internalizing externalities. This is not the place to proceed either towards a systematic exploration of these possibilities or towards an externality-based theory of institutions. In practice, doing so requires the “detailed investigation of the actual results of handling the problem in different ways” (Coase (1960, p. 18-9). We would, however, like to convey the flavor of innovative measures for the internalization of externalities through a number of examples for standard cases of external effects. All of them are designed to create implicit feedback mechanisms between those affected by externalities and those having leverage over their provision in situations dominated by informational complexity and high transaction costs.

1. Oblige the managers of critical industrial installations (chemical plants, refineries, nuclear plants, etc.) to live no more than five kilometers away from the plant.
2. Reserve one board seat in major companies for representatives of accredited consumer or environmental organizations. Of course, this representative is held to the same confidentiality requirements on commercial issues as everybody else.
3. Formulate regular and extensive environmental and social reporting requirements (this is, of course, a process currently being implemented , albeit in a haphazard and little theorized manner).
4. Facilitate class action suits for certain kinds of environmental or social issues. Class action is precisely a way of using the legal system to internalize when transaction costs are too high for the individual claimant. Precautions need to be taken not to allow such class action suits to become indiscriminate transaction costs for normal business.
5. Proceed towards a drastic review of the patent system and the protection of intellectual property rights, with increased thresholds and shorter periods of protection, thus making it more appropriate for fast-moving digital economies with intrinsic winner-takes-all structures.

The second insight is the basis for another strategy of internalization: the reduction of transaction costs to let markets participate in internalization. It is centered on the fact that externalities are due to transaction costs in the market, which hamper the establishment of appropriate feedback mechanisms. The aim this time is to lower the transaction costs so that markets can do their work. The challenge is to “commoditize” externalities. The shift in the approach to climate change from fringe issue twenty years ago to today’s functioning carbon markets is an excellent example of such a process. This example also reminds us that there are substantial costs in creating the informational and institutional infrastructures needed for such a commoditization process (codification).

Such approaches recognize that governments and other public institutions have a role in codifying externality issues in order to allow their treatment through a decentralized market process. This involves the establishment of generally accepted physical or chemical cause-impact relationships, the quantitative measurement of impacts, the allocation of costs, responsibilities and benefits and, perhaps most importantly, the advancement of processes which permit the formation of stable preferences beyond a vague “unease” or “appreciation” of specific external effects. One should never forget the basic lessons of the Coasean approach: a given externality is not the result of either a cleverly engineered social injustice or a permanent blind spot of the market system but the consequence of transaction costs that are due to the newness and the informational complexity of the externality in question and the diffuse nature of the welfare impacts connected with it. Governments or, more generally, public processes can, and indeed often do, usefully develop measures to address these issues .<sup>15</sup> Even Coase himself clearly saw clearly this interplay between public intervention and the establishment of markets:

“It is not without significance that these [financial] exchanges, often used by examples of a perfect market and perfect competition, are markets in which transactions are highly regulated... It suggests, I think correctly, that for anything approaching perfect

<sup>15</sup>

Many of the examples advanced below will have a familiar ring to them. However, the point is not that such measures do not yet exist – they are part and parcel of the inexorable codification process that all externalities undergo. The point is that they exist in a conceptual vacuum, because they have never been theorized in the context of a theory of externalities. This impedes the systematic development, linking, streamlining and improvement of such measures.



competition to exist, an intricate system of rules and regulations would normally be needed (Coase (1988), 9).”

Below we present a number of further illustrative examples of measures to reduce transactions costs.

1. Undertake basic scientific research into externalities to understand basic cause-impact relationships. The Intergovernmental Panel on Climate Change (IPCC) is a vast example of this sort of undertaking.
2. Undertake applied research in medicine, agriculture, engineering, etc. in order to acquire a solid understanding of the magnitude of the impact. Major externalities in recent years (asbestos, mad cow disease etc.) were effectively addressed once the impacts had been unequivocally established.
3. Organize political and social processes that allow responsibilities and a distribution of the costs of internalization to be established. In economic jargon this is referred to as the “allocation of property rights”, although the term implies a degree of codification rarely achieved with external effects even after such processes.
4. Advance social and individual processes of preference formation through information dissemination, public hearings, media involvement, etc. In this context, the Pigou-inspired monetization of social cost can also be partially rehabilitated, albeit as part of a much larger process of preference discovery rather than as a substitute for it.
5. Formulating systematic reporting requirements for key environmental attributes of major goods such as houses (air quality, noise level, proximity to parks, etc.), so that the market can price them.
6. Reduce transaction costs through measurement systems, transparency and disclosure requirements, standard-setting and labeling. (Examples can be found in the area of socially and environmentally responsible investment.)
7. Create markets where the codification processes have advanced sufficiently far, while being aware of the remaining transaction costs. (Markets for CO<sub>2</sub> or SO<sub>2</sub> emissions work fine thanks to the easy measurability of the underlying commodity. Markets for energy efficiency improvements, so-called “white certificates”, may be a different matter altogether.)
8. Distinguish, in the case of stubbornly and intrinsically complex externalities, which are likely to remain so, e.g. the loss of biodiversity, which are marketable (use values such as eco-tourism) and which are non-marketable (non-use values such as existence values). These attributes need to be addressed separately with different groups of instruments.
9. Recognize the multi-dimensionality of externalities. Establish partial use-rights that may be amenable to codification and market allocation, rather than all-encompassing property rights.

We said earlier that transaction costs and consequently the level of uninternalized externalities are a function of the scientific, technical and informational infrastructure. The present is therefore a propitious moment. Never before have these infrastructures been as advanced as they are now. Science permits the identification of new causal chains. Technology allows ever more precise measurements. The global information society permits much faster information transmission, debate and preference formation on the one hand and new and innovative forms of organization to establish the feedback that is missing in the case of externalities on the other. A buzzword such as “stakeholder involvement” provides a glimpse of the potential of the feedback mechanisms which might serve to *anticipate* and manage external effects but which are neither coherently theorized nor systematically applied. This article is a contribution towards a more systematic exploration of

the opportunities offered when applying Coasean insights to the frontier between market and non-market allocations of goods in a dynamic perspective.

## **7. Conclusion**

Our article elaborates Ronald Coase's thesis that the amount of externalities is determined by the level of transaction costs in the market. Contrary to Coase's own development of the implications of this insight, however, we do not consider this level as given. Because externalities are intrinsically new and dynamic effects, transaction costs diminish over time, a process that can be significantly accelerated by appropriate government action. Yet Coase's great merit is to have associated externalities with transaction costs, i.e. with the intrinsic limits of the market mechanism to proceed towards an efficient allocation of goods.

In settling for a static equilibrium approach, however, ironically Coase rejoins Arthur Cecil Pigou, whose tax-based approach he had originally set out to prove utopian at best and usually harmful at worst. Pigou's approach is indeed epistemologically untenable, even though a large literature of environmental economics has developed around it. The Pigouvian approach finds itself caught in a basic contradiction: if externalities had the desirable informational qualities that allowed governments to determine appropriate tax levels for internalization, these same externalities would already have been fully internalized by decentralized negotiations in open markets.

The final part of our article is concerned with presenting an internalization strategy to transform the primarily defensive Coasean approach into a constructive, forward-looking approach to external effects. This strategy consists of two complementary sub-strategies to address high transaction costs. The first aims at developing feedback mechanisms between generators of externalities and those affected by them through mechanisms other than the market, which include political and legal processes and specific regulatory requirements. The second seeks to reduce transaction costs to extend the perimeter inside which markets can effectively operate by codifying the informational complexities that characterize externalities. While some of the concrete measures proposed are not entirely new, they have so far arisen haphazardly from historical contingencies. What our article provides is their systematic exploration on the basis of a coherent conceptual approach built on a dynamic re-interpretation of the original Coasean insight.

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